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(54) Abstract Title

Mobile communication terminal with mobile telephone and Internet access

(57) The Internet access means comprises a data port (36) which may connect using a wired connexion, infra-red, or radio frequency e.g. Bluetooth, to a cable network. Telephone calls can be made at the same time as web pages are downloaded. The URL of a WAP data call received via the phone network may be sent via the Internet connexion to request the page in normal HTML protocol. Voice calls may be switched from the phone network to the Internet connexion and vice versa. Common voice codec (28), display (14) and keyboard (16) are provided.

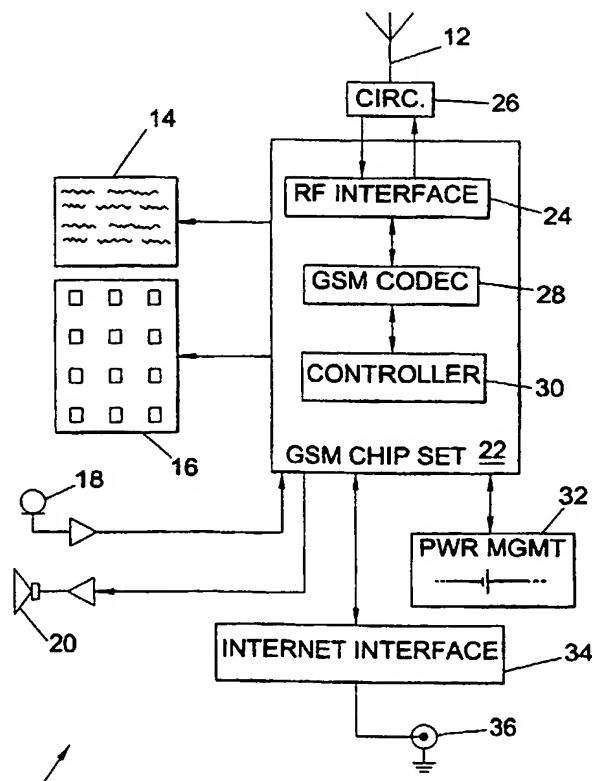


Fig. 1

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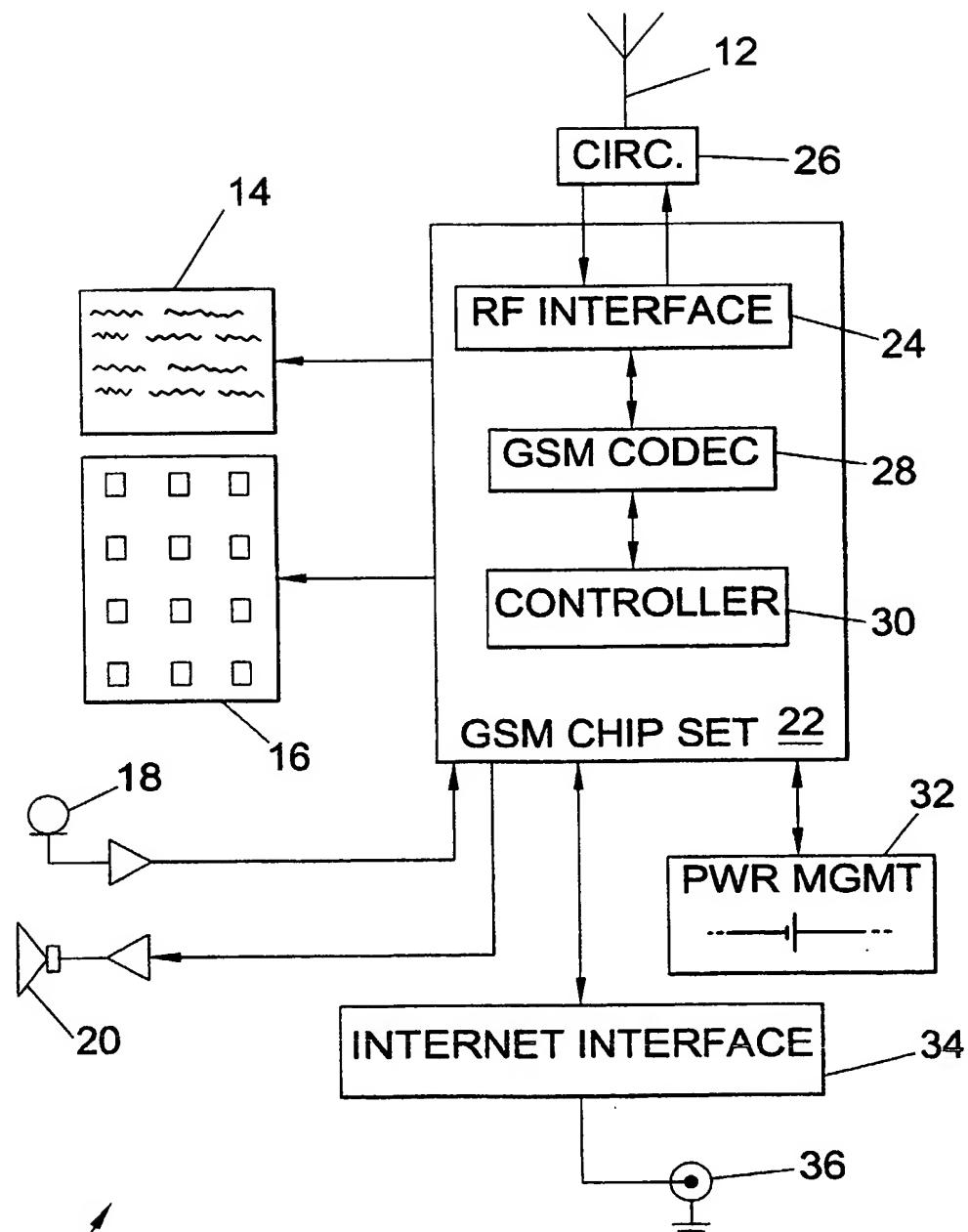


Fig. 1

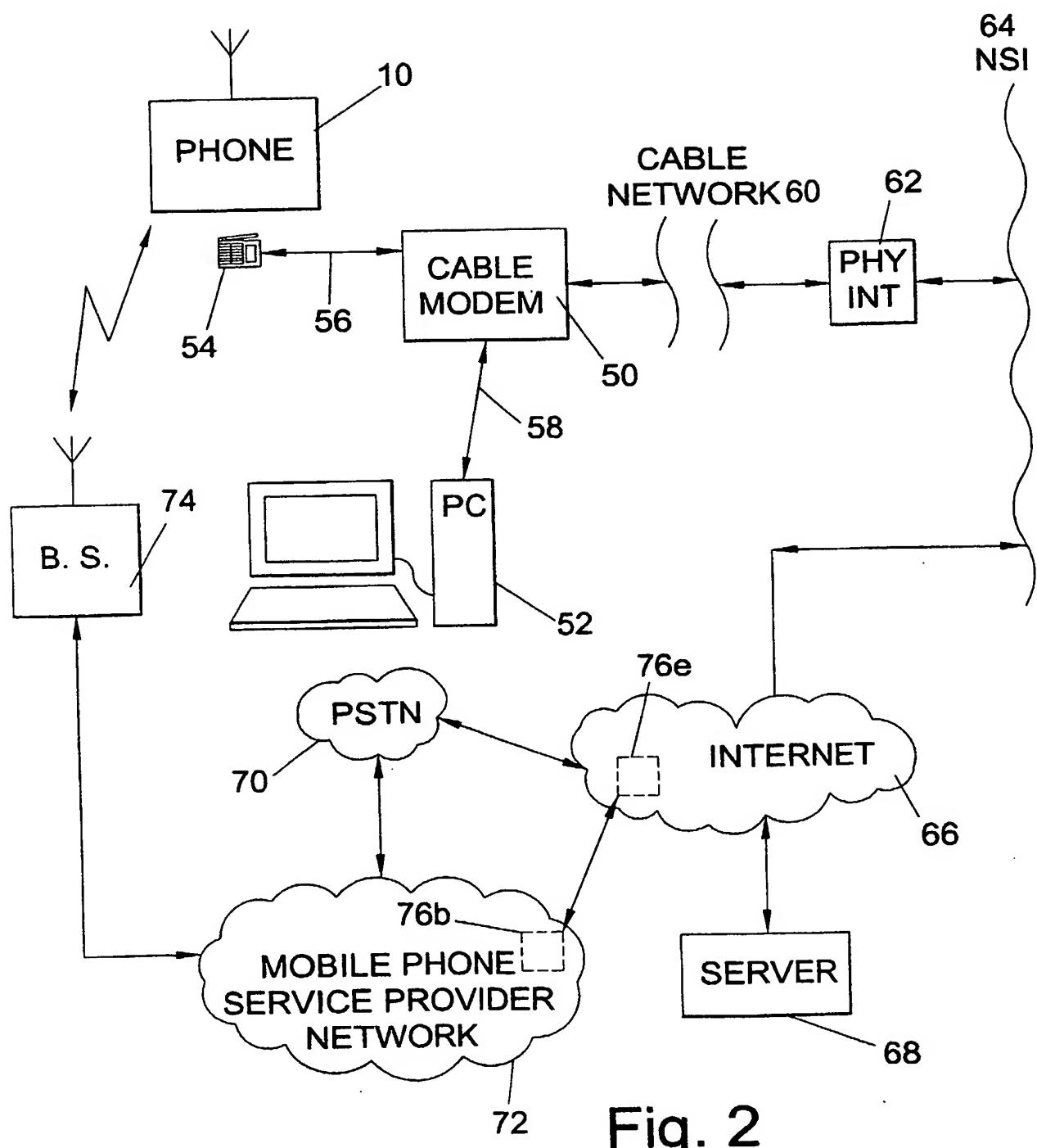


Fig. 2

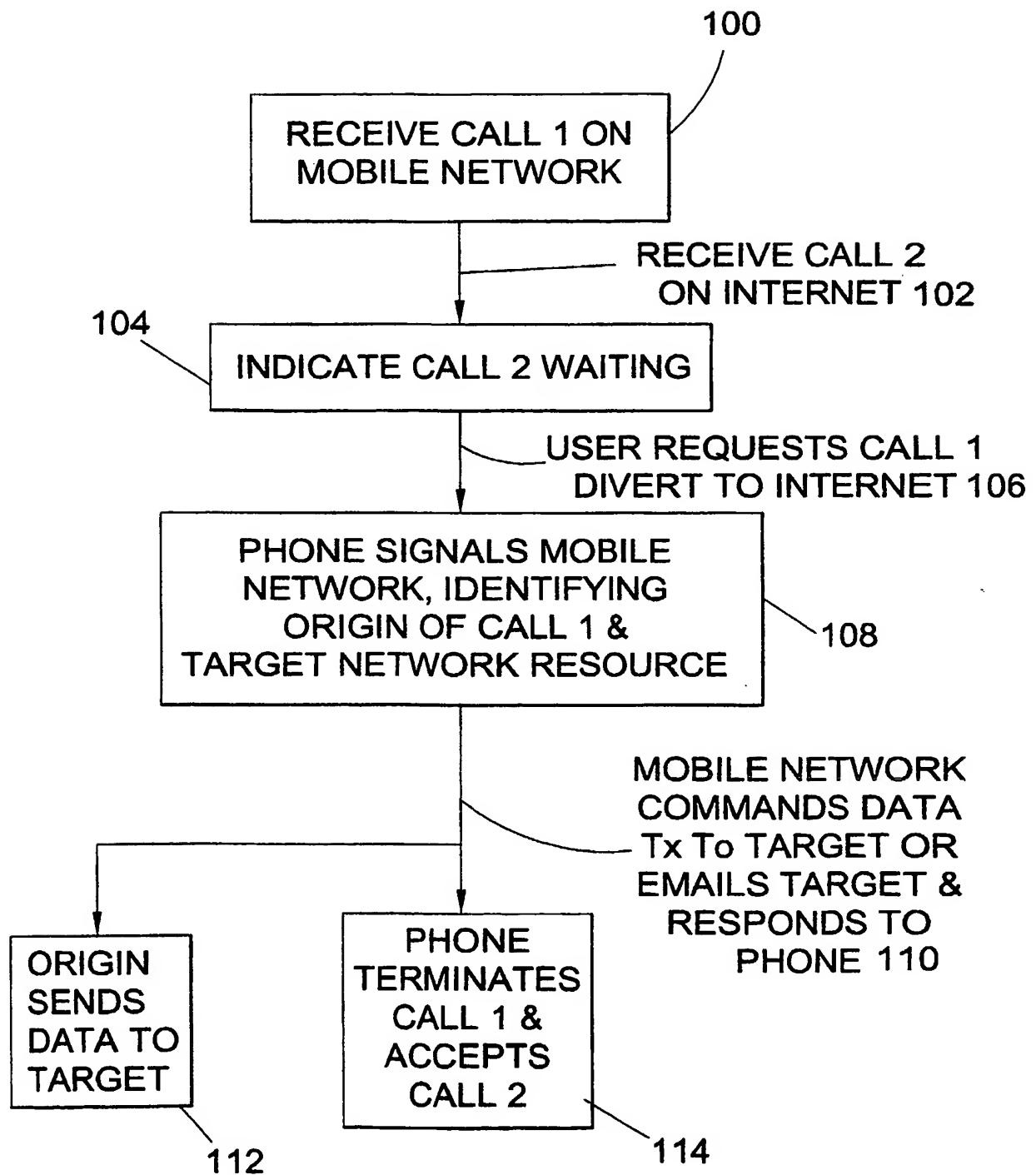


Fig. 3

Mobile Communications Systems

This invention relates to mobile communication devices such as mobile phones, in particular communication devices capable of accessing both a mobile phone network and the internet. The invention also relates to communication systems including such devices and to methods of operating such devices and systems.

Mobile telephones, that is telephones for accessing a mobile telephone network, are becoming comparable in popularity to fixed line telephones connected to the public switch telephone network (PSTN). Some mobile phones include a "cordless" telephone facility providing a short range link to a base unit with a fixed line connection to the PSTN. Generally, such a cordless phone defaults to operating over the PSTN when tethered, and operates as a mobile phone when untethered. The telephone can be "tethered" by means of a direct wire connection or by means of a short range wireless link such as an RF or infrared link.

It is also known to make telephone calls over the internet. Typically, a personal computer (PC) is provided with an audio card for analogue to digital and digital to analogue interfaces to a microphone and loudspeaker respectively, and the digitised voice information is communicated using TCP/IP (Transmission Control Protocol/Internet Protocol). Telephone calls over the internet usually terminate on a personal computer although devices specifically for making telephone calls over an IP network, called IP telephones, are also known. The physical interface to such IP telephones usually comprises an Ethernet 10 Base T connection.

Making telephone calls over the internet is generally cheaper than making calls over the PSTN or using a mobile telephone network. Often only a local call is necessary to access an internet service provider and thus effectively a call to anywhere in the world

can be made for the cost of a local call. A disadvantage with internet telephones is that the packet switched messaging employed by the internet is not optimised for voice communication, which is generally better when using a circuit switched network. However, in many situations the quality is acceptable, and will tend to improve as greater bandwidth capacity becomes available. However, IP telephones are bulky and expensive and in many cases inconvenient as they must be directly communicated to the PSTN via an external or internal modem and thus lack mobility. Mobile telephones overcome many of the disadvantages but themselves suffer from problems when accessing the internet, since at present wireless data communications are relatively slow, particularly in areas of poor coverage.

There is therefore a need for a small, relatively low-cost device capable of taking advantage of the low cost of internet voice calls, without the disadvantage of lack of flexibility and mobility and, unlike present mobile phones, capable of taking advantage of the fast internet access provided by a tethered link such as a wire connection.

According to the present invention there is therefore provided a mobile communication device for accessing a mobile phone network and for accessing the Internet, the device comprising: a housing; mobile phone network access means; an internet access means including a data port.

The communication device has internet access means including a data port for fast internet access when available. The data port provides a connection for a tethered link, for example a direct wire connection or an infrared link or a radio frequency data link such as Bluetooth (registered trade mark), to a wired or cable connection providing internet access such as, for example, a PSTN or ISDN line or a cable modem.

Preferably, the internet access means and the mobile phone network access means are both coupled to a common voice coder, such as a GSM full or half rate coder. In this way, a mobile phone can be provided which enables voice calls to be made over both the mobile phone network, when mobile, and via the internet, when a local internet

access port is available. Furthermore, the additional manufacturing cost of such a mobile phone amounts to little more than the cost of the data port which, in one embodiment, can be implemented simply by an Ethernet connector.

In a preferred arrangement, the internet access means and mobile phone network access means share a common keyboard and display.

In another aspect, the invention provides a communication system comprising: a mobile phone for accessing a mobile phone network and for accessing the Internet, the phone comprising: a housing; a mobile phone network access means; and an internet access means; a mobile phone network coupled to the internet; and a second internet access device; and wherein the mobile phone network has an associated interface including a voice codec for coding analogue voice signals originating from the mobile phone for transmission over the internet and for decoding digitised voice signals from the internet for reception

The voice codec in the interface allows voice calls made over the internet originating, for example, from a mobile communication device described above or from a PC, to be decoded and passed to the mobile phone network. The interface will couple the mobile phone network to the internet and can be regarded either as part of the mobile phone network or as a portion of some other communications infrastructure such as a portion of a PSTN or cable network. Preferably, the interface includes means to recognise that an internet data stream includes a coded voice message so that the data stream can be routed to the codec or so that the codec can be controlled for decoding the voice message in order to provide it to the mobile network. In a preferred embodiment, the voice codec and recognition means operate using one or more of the GSM voice coding standards.

Preferably, the above described mobile communication device can communicate simultaneously using the mobile phone network access means and the internet access means. This allows, for example, a voice telephone call to be made using the mobile

phone network whilst a data call is made using the internet data port. Advantageously the device also permits simultaneous voice and data calls to separate destinations to be made over the internet, using a multi-threading or data interleaving approach. In a preferred arrangement, when the phone receives calls on both the mobile phone network access means and the internet access means, it indicates to the user that a call is waiting. In one embodiment, when the device is tethered via the internet access data port communications originating from the phone default to transmission over the internet.

In another aspect, the invention provides a mobile phone for accessing a mobile phone network and for accessing the Internet, the phone comprising: a housing; mobile phone network access means; internet access means including a data port; and wherein the phone further comprises signalling means responsive to a user of the phone to signal to the mobile phone network to instruct that a call connected using one of said access means is to be switched to use the other access means.

This further facilitates the user choosing the cheapest practicable route for originating and receiving calls and provides the additional flexibility of switching between routes according to the availability of local internet access and to the need for mobility. Thus, when a call is received on a mobile phone, the user can signal to the mobile network using the internet access data port to instruct the network to divert the call to a preferably high speed internet modem coupled to the data port and thus allow the call to proceed via the internet access means. Likewise, calls can be switched in the other direction to allow the user to take a call via the data port and then to continue the call using the mobile phone network, thus allowing the mobile phone to be untethered.

In a yet further aspect, the invention provides a mobile communication device for accessing a mobile phone network and for accessing the Internet, the device comprising: a housing; mobile phone network access means; an internet access means including a data port; means to receive a data communication comprising data of a first type; and signalling means responsive to a user of the device to, when a data communication is

received, issue a signal to request that data of a second type, related to the first type of data, be sent to a second internet access device.

These features allow a user to copy or divert data from the mobile communication device to, for example, a PC where the data can be stored or processed or redistributed, for example on a local area network. This therefore provides a greater flexibility in moving data to where it is required. The capability to signal to a network to change the path of incoming calls either via the mobile phone network or via the internet data port thus applies to incoming data from the internet, additionally or alternatively to voice calls described above. Thus an user viewing an HTML page on a PC via, for example, a cable modem or ADSL connection, can signal to the network to have the HTML page sent to the mobile communication device using the mobile phone network (or vice versa).

In one embodiment, the HTML page is reformatted in the network to optimise the page for display on the mobile communication device or second internet access device as appropriate. Alternatively, the data can effectively be reformatted locally at one or other of these devices.

In another embodiment the mobile communication device receives a first type of data and the second internet access device, such as the PC, receives a second type of data, for example HTML data. This allows wireless application protocol (WAP) data to be sent to a mobile phone, for which it is optimised. The WAP data may originate from the same or different internet resource, with the same or a different universal resource locator (URL), but at least a portion of the information content of the HTML data and the WAP data corresponds since the two data types effectively provide different presentation windows onto common underlying information.

In accordance with this concept, the invention also provides a communication system comprising: a mobile phone for accessing a mobile phone network and for accessing the Internet, the phone comprising: a housing; a mobile phone network access means; and

an internet access means; a mobile phone network coupled to the internet; and a second internet access device; wherein a first data stream is receivable by one of the mobile phone and the second internet access device and wherein the mobile phone network has means responsive to one of the mobile phone and the second internet access device to direct a second data stream with content corresponding to the first data stream to the other of the mobile phone and the second internet access device.

These and other aspects of the invention will now be further described, by way of example only, with reference to the accompanying figures in which:

Figure 1 shows a mobile phone;

Figure 2 shows a communications system including a mobile phone; and

Figure 3 shows states of a mobile phone during diversion of a call.

Referring to Figure 1, a mobile phone 10 comprises an aerial 12, a display 14, a keyboard 16, a microphone 18 and a speaker 20 all coupled to a GSM chip set 22. The GSM chip set includes a number of functional elements of which 3 are illustrated schematically. RF interface 24 is coupled to aerial 12 by means of a device 26, such as a circulator, which separates outgoing from incoming signals. The GSM chip set also includes a GSM codec 28 for digitally coding analogue voice input from microphone 18 and for decoding received encoded audio to loud speaker 20. The RF interface 24 and GSM codec 28 are controlled by controller 30. The phone typically includes a power management system 32, schematically shown separately. The phone also includes means 34 to interface to the internet, coupled to data port 36, in one embodiment an RJ 45 Ethernet socket. In other embodiments, connector 36 may be replaced by a short range radio link, such as Bluetooth (registered trade mark) or an infrared link. When no connection is made to data port 36 the telephone defaults to connecting, if possible, to a mobile phone network via aerial 16; when tethered via data port 36 the phone defaults to sending and receiving calls via the internet.

Figure 2 shows the phone 10 as part of a communications system. Phone 10 is connectable to cable modem 50 by means of Cat 5 cable 56 and RJ 45 plug 54, to provide internet access. PC 52 is likewise connected to cable modem 50 via line 58 to provide PC 52 with internet access. The connections to cable modem 50 are typically 10 Base-T Ethernet connections (IEEE 802.3). Cable modem 50 is located on a branch of cable network 60, comprising fibre optic and/or coaxial cable. Cable network 60 is coupled to network side interface (NSI) 64 via a physical interface 62 and, typically, a cable modem termination (not shown). Network side interface 64 is coupled to internet 66 which provides access to internet resources such as server 68 (in many instances, server 68 is considered part of the internet). A mobile phone service provider network is shown schematically at 72; this is coupled to internet 66 directly and/or via PSTN 70 and other means. Base station 74, which is part of the mobile phone network, is shown separately in radio communication with phone 10.

In Figure 2, phone 10 is shown connected to cable modem 50 but, in general, any suitable internet connection can be employed. These include an ADSL (asymmetric digital subscriber line) or DSL modem and connection via a Local or Wide Area Network (LAN/WAN). The connection may also include network components such as hubs, routers, switches and other devices. Likewise, PC 52 can, in general, be supplemented or replaced by other internet access means such as an internet enabled television. A browser in the PC or other device is used to send and receive data at high speed to and from the internet via the cable modem. Still referring to Figure 2, one or other or both of internet 66 and mobile phone network 72 include a GSM coder/decoder 76 A and B, to allow translation between analogue and digitised audio; in some applications, the audio will be re-digitised at a later point in the network.

When the RJ45 plug is inserted into the hand portable telephone it becomes connected to the cable modem. The IP telephone functionality and mobile phone functionality is arranged such that calls can be received via either the mobile phone network or the cable modem network.

Telephone calls can be made using the hand portable telephone via the cable modem and the cable television network. Such telephone calls can be in progress whilst at the same time as World Wide Web pages are down-loaded at very high speed from the Internet to the PC. Similarly requests can be made from the PC for Web pages (or corresponding Web pages) via the cable modem whilst a telephone call is in progress via the mobile phone network.

The mobile phone functionality can be toggled via key strokes between the IP phone and mobile radio phone functionality for the purpose of the user deciding which network to make calls over. Thus whilst tethered to the cable modem it can receive an incoming cellular radio call and the phone will ring in the normal way. The user has the option requesting the network to route (divert) the incoming call via the other network by sending a request over that other network.

Whilst tethered the mobile phone can receive an incoming WAP (Wireless Application Protocol) data call from the cellular radio network. The URL of that message is received. The user can send a request from his/her hand portable telephone via the cable modem using that same URL and receive the page in normal HTML rather than WAP protocols - thus benefiting from enhanced graphics. Similarly the user can request the reverse thus being able to disconnect from the cable modem and have use of the WAP page on the move. Whilst tethered the phone can also be used as an IP phone to make and receive voice over IP calls via the cable modem network.

Referring now to Figure 3, this illustratively shows states of a mobile communication device or phone which receives two simultaneous calls. In state 100, the mobile phone is connected to the internet via the internet access data port but is receiving call 1, a data call comprising a web page, over the mobile phone network. At event 102 the phone receives call 2, a voice call, from the internet. This provides an interrupt to the mobile phone software which causes the display to indicate that call 2 is waiting 104. The user then presses a key on keyboard 16 to request that call 1 is diverted to the internet 106,

and this causes the phone to signal 108 to the mobile network with a corresponding request identifying the origin of call 1 and a target network resource which is the URL of the phone's internet access means. The mobile network then arranges 110 for transmission of the data of call 1 to be continued to the phone's internet access means, and the phone software matches up the end of the data received by the mobile network with the start of the data received by the internet. Alternatively, or additionally, the mobile network can arrange for information corresponding to the data call to be sent to the phone or to some other target in another way, such as by e-mail. Once transmission of data for call 1 has been set up over the internet, the phone terminates call 1 and accepts call 2, at 114, whilst call 1 data transmission continues at 112. In general, call 1 can be diverted to a PC or other internet accessed device rather than to the phone to enable data to be moved or coupled to where it is most convenient. The call diversion/copying process can also be arranged to operate automatically rather than in response to a manual user request.

No doubt, many alternative effective arrangements will occur to the skilled person and the invention is not limited to the described embodiments.

**CLAIMS:**

1. A mobile communication device for accessing a mobile phone network and for accessing the Internet, the device comprising:
  - a housing;
  - mobile phone network access means;
  - an internet access means including a data port.
2. A mobile communication device as claimed in claim 1, wherein the internet access means and mobile phone network access means are both coupled to a common voice coder, whereby the device is able to communicate voice messages over the Internet.
3. A device as claimed in claim 2 which has mobile telephone functionality and in which the internet access means and mobile phone network access means share a common keyboard and display.
4. A device as claimed in claim 1, 2 or 3 comprising means to communicate simultaneously using the mobile network access means and the internet access means.
5. A device as claimed in claim 4 further comprising means to indicate to a user when communications are received simultaneously.
6. A device as claimed in any preceding claim comprises means to communicate voice and data messages simultaneously to separate destinations.
7. A device as claimed in any preceding claim further comprising means to signal to one of the phone network and internet to direct a communication received via one of the said access means to the other access means.

8. A device as claimed in any preceding claim wherein said internet access means includes a connector and wherein connecting to the connector selects a default state of the device in which communication is initially via the internet.

9. A mobile phone for accessing a mobile phone network and for accessing the Internet, the phone comprising:

a housing;

mobile phone network access means;

internet access means including a data port; and

wherein the phone further comprises signalling means responsive to a user of the phone to signal to the mobile phone network to instruct that a call connected using one of said access means is to be switched to use the other access means.

10. A mobile communication device for accessing a mobile phone network and for accessing the Internet, the device comprising:

a housing;

mobile phone network access means;

an internet access means including a data port;

means to receive a data communication comprising data of a first type; and

signalling means responsive to a user of the device to, when a data communication is received, issue a signal to request that data of a second type, related to the first type of data, be sent to a second internet access device.

11. A device as claimed in claim 10 wherein at least a portion of the data of the first type and a portion of the data of the second type have a corresponding information content.

12. A device as claimed in claim 10 or 11, wherein the first type of data is internet protocol (IP) data formatted for reception by a mobile phone and wherein the second type of data is internet protocol data formatted for reception by the second internet access device.

13. A device as claimed in claim 12 wherein the first data type is WAP data and wherein the second data type is HTML data.
14. A device as claimed in any one of claims 10 to 13 wherein reception of the first type of data is terminated after said signalling means issues said signal.
15. A device as claimed in claim 10 wherein the first type of data is the same as the second type of data.
16. A communication system comprising:
  - a mobile phone for accessing a mobile phone network and for accessing the Internet, the phone comprising: a housing; a mobile phone network access means; and an internet access means;
  - a mobile phone network coupled to the internet; and
  - a second internet access device;

wherein a first data stream is receivable by one of the mobile phone and the second internet access device and wherein the mobile phone network has means responsive to one of the mobile phone and the second internet access device to direct a second data stream with content corresponding to the first data stream to the other of the mobile phone and the second internet access device.
17. A communication system as claimed in claim 16 wherein the first data stream is received from a first internet resource and the second data stream is received from a second internet resource having content corresponding to that of the first resource.
18. A communication system as claimed in claims 16 or 17 wherein the first data stream is a WAP data stream for reception by the mobile phone and the second data stream comprises HTML data for the second internet access device.

19. A communication system as claimed in claim 16 wherein the second data stream is generated from the first data stream.
  20. A communication system as claimed in any one of claims 16 to 19 wherein the mobile phone network has an associated interface including a voice codec for coding analogue voice signals originating from the mobile phone for transmission over the internet and for decoding digitised voice signals from the internet for reception by the mobile phone.
  21. A communication system comprising:
    - a mobile phone for accessing a mobile phone network and for accessing the Internet, the phone comprising: a housing; a mobile phone network access means; and an internet access means;
    - a mobile phone network coupled to the internet; and
    - a second internet access device; andwherein the mobile phone network has an associated interface including a voice codec for coding analogue voice signals originating from the mobile phone for transmission over the internet and for decoding digitised voice signals from the internet for reception by the mobile phone.
  22. A communication system as claimed in claim 21 further comprising means to recognise that an internet data stream includes a coded voice message for said decoding.

Amended claims have been filed as follows

**CLAIMS:**

1. A mobile communication device for accessing a mobile phone network and for accessing the Internet, the device comprising:
  - a housing including a microphone and loudspeaker;
  - mobile phone network access means;
  - an internet access means including a digital data port;wherein the internet access means and mobile phone network access means are both coupled to a common voice coder, whereby the device is able to communicate voice messages over the Internet.
2. A mobile communication device as claimed in claim 1, wherein the device has IP telephone functionality..
3. A device as claimed in claim 2 which has mobile telephone functionality and in which the internet access means and mobile phone network access means share a common keyboard and display.
4. A device as claimed in claim 1, 2 or 3 comprising means to communicate simultaneously using the mobile network access means and the internet access means.
5. A device as claimed in claim 4 further comprising means to indicate to a user when communications are received simultaneously.
6. A device as claimed in any preceding claim comprises means to communicate voice and data messages simultaneously to separate destinations.
7. A device as claimed in any preceding claim further comprising means to signal to one of the phone network and internet to direct a communication received via one of the said access means to the other access means.

8. A device as claimed in any preceding claim wherein said internet access means includes a connector and wherein connecting to the connector selects a default state of the device in which communication is initially via the internet.

9. A mobile phone for accessing a mobile phone network and for accessing the Internet, the phone comprising:

a housing including a microphone and loudspeaker;

mobile phone network access means;

internet access means including a data port; and

wherein the phone further comprises signalling means responsive to a user of the phone to signal to the mobile phone network to instruct that a call connected using one of said access means is to be switched to use the other access means.

10. A mobile communication device for accessing a mobile phone network and for accessing the Internet, the device comprising:

a housing including a microphone and loudspeaker;

mobile phone network access means;

an internet access means including a data port;

means to receive a data communication comprising data of a first type; and

signalling means responsive to a user of the device to, when a data communication is received, issue a signal to request that data of a second type, related to the first type of data, be sent to a second internet access device.

11. A device as claimed in claim 10 wherein at least a portion of the data of the first type and a portion of the data of the second type have a corresponding information content.

12. A device as claimed in claim 10 or 11, wherein the first type of data is internet protocol (IP) data formatted for reception by a mobile phone and wherein the second type of data is internet protocol data formatted for reception by the second internet access device.

13. A device as claimed in claim 12 wherein the first data type is WAP data and wherein the second data type is HTML data.
14. A device as claimed in any one of claims 10 to 13 wherein reception of the first type of data is terminated after said signalling means issues said signal.
15. A device as claimed in claim 10 wherein the first type of data is the same as the second type of data.
16. A communication system comprising:
  - a mobile phone for accessing a mobile phone network and for accessing the Internet, the phone comprising: a housing including a microphone and loudspeaker; a mobile phone network access means; and an internet access means;
  - a mobile phone network coupled to the internet; and
  - a second internet access device;

wherein a first data stream is receivable by one of the mobile phone and the second internet access device and wherein the mobile phone network has means responsive to one of the mobile phone and the second internet access device to direct a second data stream with content corresponding to the first data stream to the other of the mobile phone and the second internet access device.
17. A communication system as claimed in claim 16 wherein the first data stream is received from a first internet resource and the second data stream is received from a second internet resource having content corresponding to that of the first resource.
18. A communication system as claimed in claims 16 or 17 wherein the first data stream is a WAP data stream for reception by the mobile phone and the second data stream comprises HTML data for the second internet access device.
19. A communication system as claimed in claim 16 wherein the second data stream is generated from the first data stream.

20. A communication system as claimed in any one of claims 16 to 19 wherein the mobile phone network has an associated interface including a voice codec for coding analogue voice signals originating from the mobile phone for transmission over the internet and for decoding digitised voice signals from the internet for reception by the mobile phone.
21. A communication system comprising:
  - a mobile phone for accessing a mobile phone network and for accessing the Internet, the phone comprising: a housing including a microphone and loudspeaker; a mobile phone network access means; and an internet access means;
  - a mobile phone network coupled to the internet; and
  - a second internet access device; andwherein the mobile phone network has an associated interface including a voice codec for coding analogue voice signals originating from the mobile phone for transmission over the internet and for decoding digitised voice signals from the internet for reception by the mobile phone.
22. A communication system as claimed in claim 21 further comprising means to recognise that an internet data stream includes a coded voice message for said decoding.



Application No: GB 0011686.3  
Claims searched: 1-9

Examiner: Nigel Hall  
Date of search: 5 December 2001

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): H4L (LRAD)

Int Cl (Ed.7): H04Q 7/32

Other: Online: WPI, EPODOC, JAPIO

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2355370 A (SAGEM)	1
X, E	WO 00/51375 A1 (GENESYS)	1,7,8

- |   |                                                                                                           |   |                                                                                                                  |
|---|-----------------------------------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------|
| X | Document indicating lack of novelty or inventive step                                                     | A | Document indicating technological background and/or state of the art.                                            |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category. | P | Document published on or after the declared priority date but before the filing date of this invention.          |
| & | Member of the same patent family                                                                          | E | Patent document published on or after, but with priority date earlier than, the filing date of this application. |